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INTERNATIONALE  
INTERNATIONAL  
STANDARD**

**CEI  
IEC  
60857**

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AMENDEMENT 2  
AMENDMENT 2

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Amendement 2

**Système de vidéodisque optique  
réfléchissant préenregistré –  
«Laser vision» 60 Hz/525 lignes – M/NTSC**

Amendment 2

**Pre-recorded optical reflective  
videodisk system –  
"Laser vision" 60 Hz/525 lines – M/NTSC**

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Международная Электротехническая Комиссия

CODE PRIX  
PRICE CODE

**R**

*Pour prix, voir catalogue en vigueur  
For price, see current catalogue*

## FOREWORD

This amendment has been prepared by subcommittee 100B: Recording, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

The text of this amendment is based on the following documents:

FDIS	Report on voting
100B/34/FDIS	100B/62/RVD

Full information on the voting for the approval of this amendment can be found in the report on voting indicated in the above table.

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## CONTENTS

*Add the title of clause 13 as follows:*

13 Implementation of a digital audio signal

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## 4 Mechanical parameters

*Add, after subclause 4.1.2, the following new subclause 4.1.3:*

Characteristics to be specified	Requirements	Methods of measurement and/or conditions
4.1.3 Thickness of single disk (T), figure 1	min. = 1,1 mm, see figure 1a max. = 1,4 mm	

*Replace the existing subclause 4.4 by the following:*

Characteristics to be specified	Requirements	Methods of measurement and/or conditions
4.4 Label (E), figure 1	A label on both sides of a double and a single disk is allowed. The label of a single disk on the transparent side is optional, but the label on the protective layer side is mandatory	
4.4.1 Inside diameter of label (F), figure 1	min. = 35 mm max. = 38 mm	
4.4.2 Outside diameter of label (G), figure 1	min. = 86 mm max. = 100 mm	

Characteristics to be specified	Requirements	Methods of measurement and/or conditions
4.4.3 Outside diameter of the label (G), figure 1 of a single disk on the protective layer side	min. = 86 mm max. = 300 mm	
4.4.4 Thickness of label (H), figure 1	Such that thickness of disk in clamping area (subclause 4.5.3) is within specification	
4.4.5 Position of label	Should overlap neither centre hole nor, in case of a single disk, the outer diameter of the protective layer side	

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*Replace the existing subclause 4.5.3 by the following:*

Characteristics to be specified	Requirements	Methods of measurement and/or conditions
4.5.3 Thickness of disk in clamping area including labels		
4.5.3.1 For double disk (J), figure 1	min. = 2,2 mm max. = 2,9 mm	
4.5.3.2 For single disk (U), figure 1	min. = 1,1 mm, see figure 1b max. = 1,45 mm, see figure 1b	

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*Add, after subclause 4.16.3, the following new subclause 4.16.4:*

Characteristics to be specified	Requirements	Methods of measurement and/or conditions
4.16.4 Maximum radial angle ( $\theta$ ) between the normal on the surface (not infoside) and the optical axis	$\pm 1^\circ$	See figure 2

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*Replace the existing subclause 4.20.1 by the following:*

Characteristics to be specified	Requirements	Methods of measurement and/or conditions
4.20.1 Minimum		
8 in version	35	
12 in version	35	

Replace the existing subclause 4.21.1 by the following:

Characteristics to be specified	Requirements	Methods of measurement and/or conditions
4.21.1 Minimum		
8 in version	0,18	
12 in version	0,18	

## 5 Optical requirements

Replace the existing subclause 5.2 by the following:

Characteristics to be specified	Requirements	Methods of measurement and/or conditions
5.2 Birefringence of transparent disk (double pass)	40° max.	

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## 6 Temperature and humidity requirements

Replace the text in the second column by the following new text:

Requirements
Must satisfy all requirements following exposure to any temperature within the range of 5 °C to 45 °C at any relative humidity within the range of 5 % to 90 % held constant for a period of four days

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### 10.1.10 CLV picture number

Replace the text of subclause 10.1.10 by the following new text:

On the CLV disk the CLV picture number identifies pictures and can also be used to detect hang-ups.

Code: 8 X1 E X3 X4 X5

X1 = A through F and X3 = 0 through 9.

X1 and X3 indicate the seconds of the run time together with the hours and minutes of the programme time code.

X4 and X5 are the picture numbers within 1 s, thus:

X4 = 0 through 2 and X5 = 0 through 9.

The CLV picture number shall be inserted into line 16 or 279 depending on which field is the first field of the picture.

To resolve the colour time error, the seconds count within the CLV picture number should jump to the next value (X1, X3 part incremented by 1; X4 and X5 part reset to zero) at the first following renewal of the CLV picture number, each time the accumulated number of video frames (N) equals one of the numbers in the following sequence:

$$N = 8\,991 \times L + 899 \times M$$

where L and M are integer, and  $0 \leq L$  and  $0 \leq M \leq 9$

For example:

$$N = 899, 1\,798, \dots, 8\,091, 8\,991, 9\,890, \dots$$

The start of the programme time code is zero hour and zero minute, and that of CLV picture number is zero second and zero picture at the beginning of the active programme.

### 10.2.3 *Picture numbers*

*Replace the text of subclause 10.2.3 by the following new text:*

The picture numbers are always present on CAV disks. They are unique and in normal count sequence, starting with the number 1 at the beginning of the active programme. The maximum available picture number is 79 999.

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### 11.1.2 *Numerical aperture*

*Replace the text of subclause 11.1.2 by the following new text:*

The numerical aperture of the lens of the readout beam is:

$$NA = 0,40 \pm 0,01.$$

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## **12 Operational parameters**

*Add, after clause 12, the following new clause 13:*

## **13 Implementation of a digital audio signal**

This clause specifies the implementation of a digital audio signal as an optional addition to the laser vision system (LV). See sections three and four of IEC 60908.

## 13.1 *Signal modulation*

### 13.1.1 *General*

The EFM signal, as defined in IEC 60908, prior to modulation, is filtered by a low-pass filter with a frequency response as detailed in 13.1.2, a high-pass filter with a response as shown in figure 24 and shall have a pre-emphasis as detailed in figure 24. The digital signal is a symmetrical double edge pulsewidth modulated onto the main carrier and recorded onto the disk as shown in figure 22.

### 13.1.2 *Low-pass filter (see figure 23)*

a) The frequency response shall be as follows:

- 1) up to 1,6 MHz  $\pm 0,5$  dB (ref. 0,5 MHz)
- 2) 1,75 MHz  $(-3 \pm 0,5)$  dB
- 3) 2 MHz  $(-26 \pm 2)$  dB
- 4) >2,3 MHz  $< -50$  dB

b) The group delay shall be as follows:

- 1) <0,5 MHz  $(0 \pm 20)$  ns (ref. 0,5 MHz)
- 2) 0,8 MHz  $(-50 \pm 20)$  ns
- 3) 1 MHz  $(-100 \pm 50)$  ns
- 4) 1,2 MHz  $(-180 \pm 50)$  ns
- 5) 1,4 MHz  $(-350 \pm 75)$  ns

NOTE – This group delay is a pre-distortion for the low-pass filter of the player.

### 13.1.3 *Pre-emphasis*

The EFM signal prior to modulation shall have a pre-emphasis according to figure 24.

### 13.1.4 *High-pass filter*

The EFM signal prior to modulation shall be filtered by a high-pass filter according to figure 24.

### 13.1.5 *Modulation of the filtered EFM signal*

The filtered EFM signal shall be a symmetrical double edge pulse width modulated on the main carrier.

The level of this modulated EFM signal in the recorded frequency spectrum shall be  $-27 \text{ dB} \pm 1 \text{ dB}$  with respect to the unmodulated main carrier when no audio signal is present during digital silence (see figure 25).

### 13.1.6 *Block error rate (BLER)*

#### 13.1.6.1 *Definitions*

See IEC 60908, section three, subclause 11.1.1.

#### 13.1.6.2 *Specification of random errors*

BLER averaged over any 10 s shall be  $\leq 8 \times 10^{-2}$  with a recommendation of  $\leq 3 \times 10^{-2}$ .

### 13.1.6.3 *Specification of burst errors*

See 11.1.3 of amendment 1 of IEC 60908.

### 13.2 *Sample frequency*

The audio sample frequency shall be:

$$F_s = \frac{7007}{2500} \times F_H \quad (44,1 \text{ kHz nominal})$$

$F_H$  is the line frequency corresponding to the video signal (60 Hz/525 lines – M/NTSC system).

### 13.3 *Compensation of time delay*

Since the digital audio decoder delays the audio signal by 15,3 ms, it is recommended to advance the audio signals, modulated into the EFM signal, relative to the related video signal.

### 13.4 *Levels of analogue audio subcarriers*

Deviating from subclause 7.2.2, the levels of the analogue audio subcarriers in the recorded frequency spectrum shall be  $-30 \text{ dB} \pm 1 \text{ dB}$  with respect to the unmodulated main carrier.

### 13.5 *Polarity of modulation*

The polarity of the audio modulation shall be such that MSB = 0 of encoded data words in the EFM signal corresponds with a positive instantaneous frequency deviation of the analogue audio subcarriers.

### 13.6 *Control and display system compact disk (subcode)*

#### 13.6.1 *Subcode*

The subcode is according to IEC 60908, clause 17, with the following modifications:

##### 13.6.1.1 *ADR*

*Change "0001: ADR 1, mode 1 for DATA-Q" to "0100: ADR 4, mode 4 for DATA-Q".*

##### 13.6.1.2 *Subclause 17.5.1*

*Change title "Mode 1 for DATA-Q" to "Mode 4 for DATA-Q". In the first line, change "ADR = 1 = (0001)" to "ADR = 4 = (0100)" and, in the third line, change "mode 1" to "mode 4".*

#### 13.6.2 *Table of content (TOC)*

The repetitive TOC shall be recorded in such a way that, at the end of the lead-in area, the table of content can be ended with any value of point.

The video system identification code shall be recorded according to IEC 60908-2 (12 cm CD - V).

P frame is 12 = NTSC "LV disk" with digital stereo sound

P frame is 13 = NTSC "LV disk" with digital bilingual sound.

#### 13.6.2.1 *Position lead-in subcode of compact-disk*

13.6.2.1.1 Start of CD lead-in subcode in accordance with start lead-in code LV in this standard.

13.6.2.1.2 Length of CD lead-in subcode in accordance with this standard.

#### 13.6.2.2 *Position lead-out subcode of compact disk*

13.6.2.2.1 Start of CD lead-out subcode in accordance with start lead-out code LV in this standard.

13.6.2.2.2 Length of CD lead-out subcode in accordance with this standard.

#### 13.6.3 *Relation track number (CD) and chapter number (LV)*

13.6.3.1 The chapter numbers shall be present in the video programme area. They should start with chapter "0" or "1" or a pre-set number of a previous disk with the same programme content. If they start with chapter "0", the length of chapter "0" area should be within 1 min.

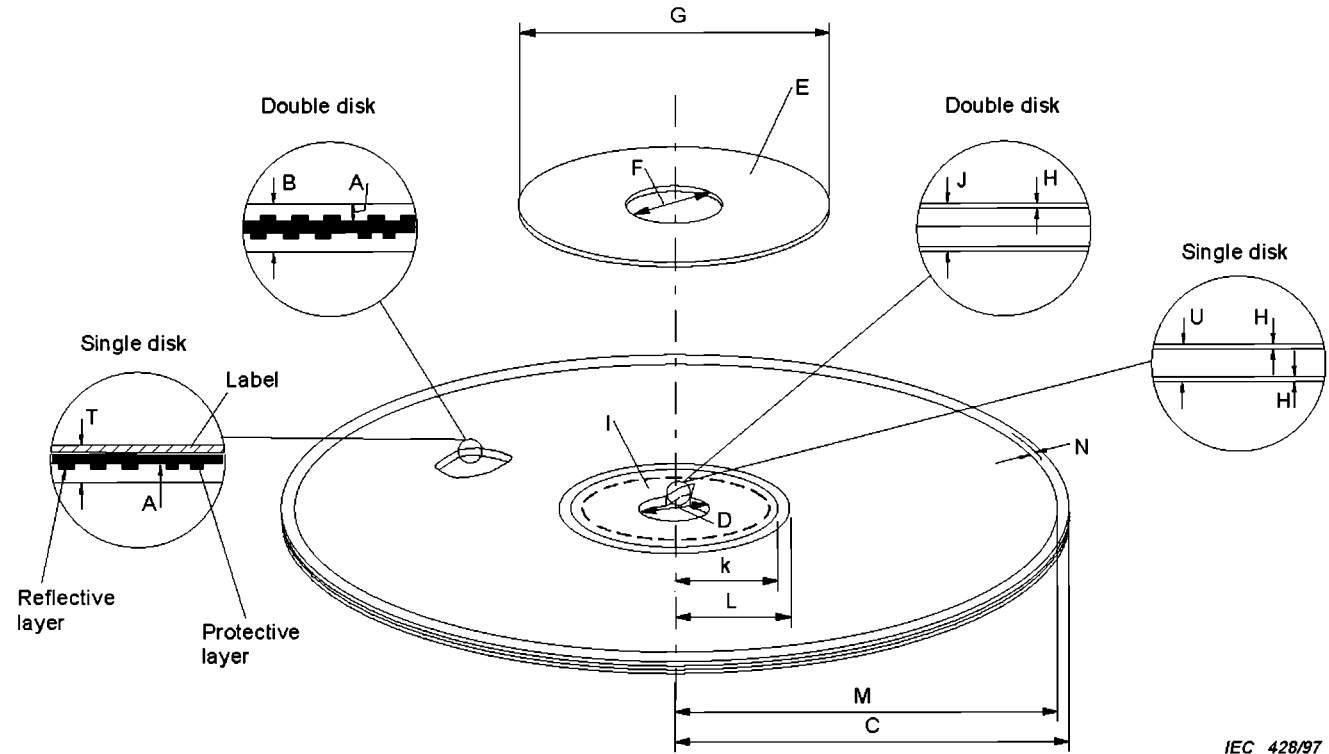
13.6.3.2 The track number (TNO) in CD shall be the same as the chapter number in LV with the exception of chapter "0" (see 13.6.3.1), chapter "0" is then a part of track number "1".

13.6.3.3 Maximum track number CD in LV is 79.

13.6.3.4 Minimum length of a track (chapter) shall conform to this standard.



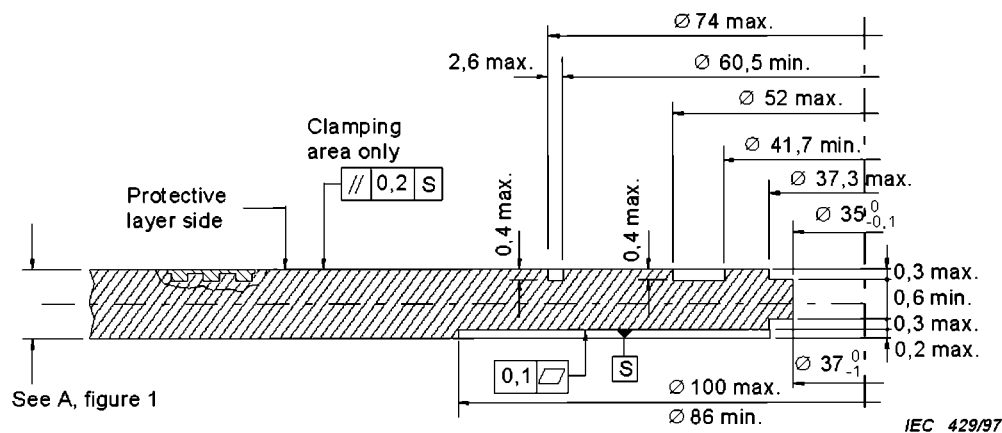
Replace the existing figure 1 by the following:



IEC 428/97

**Figure 1 – Mechanical parameters of the disk (see 4.1 to 4.13)**

Add, after figure 1a, the following new figure 1b:



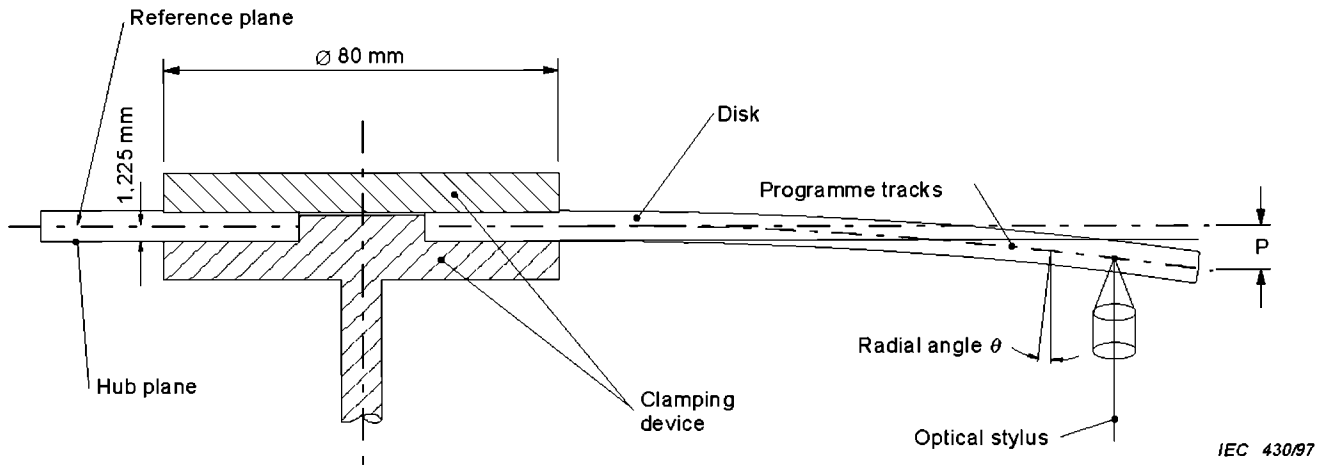
(not to scale)

Dimensions in millimetres

NOTE – Flat single disks without notches or dents are recommended. However, to enable single disks to be produced with equipment for double disk production, the profile shown in figure 1b is permitted.

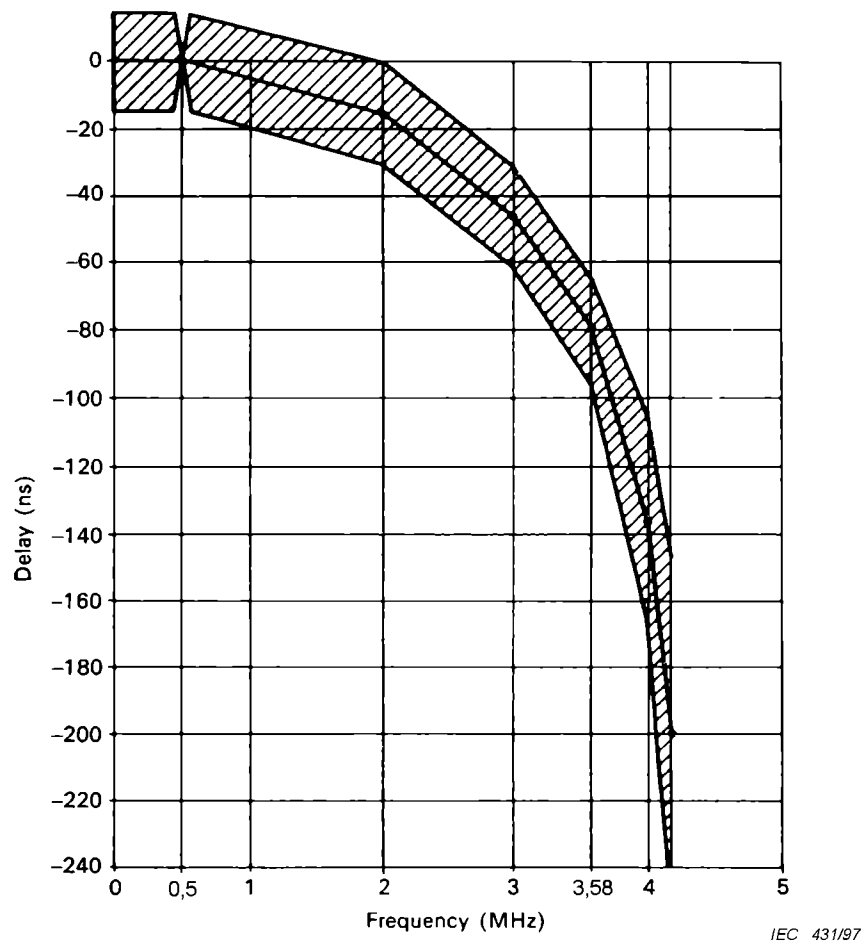
**Figure 1b – Possible profiling of the clamping area of a single disk without labels (see 4.5.3.2)**

Replace the existing figure 2 by the following:



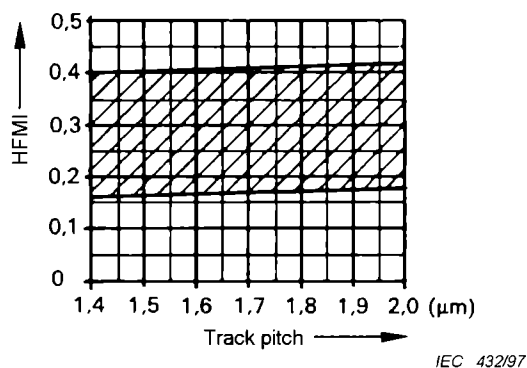
**Figure 2 – Measurement of vertical deviation and radial angle  $\theta$  of programme tracks during rotation at playback speed (see 4.16)**

Replace the existing figure 8 by the following:



**Figure 8 – Group delay pre-distortion (see 9.1.7)**

Replace the existing figure 18 by the following:



$$S_r = (802 \pm 26) \text{ pits/mm}$$

$$S_r = \frac{f}{2\pi R \cdot f_r} \text{ pits/mm}$$

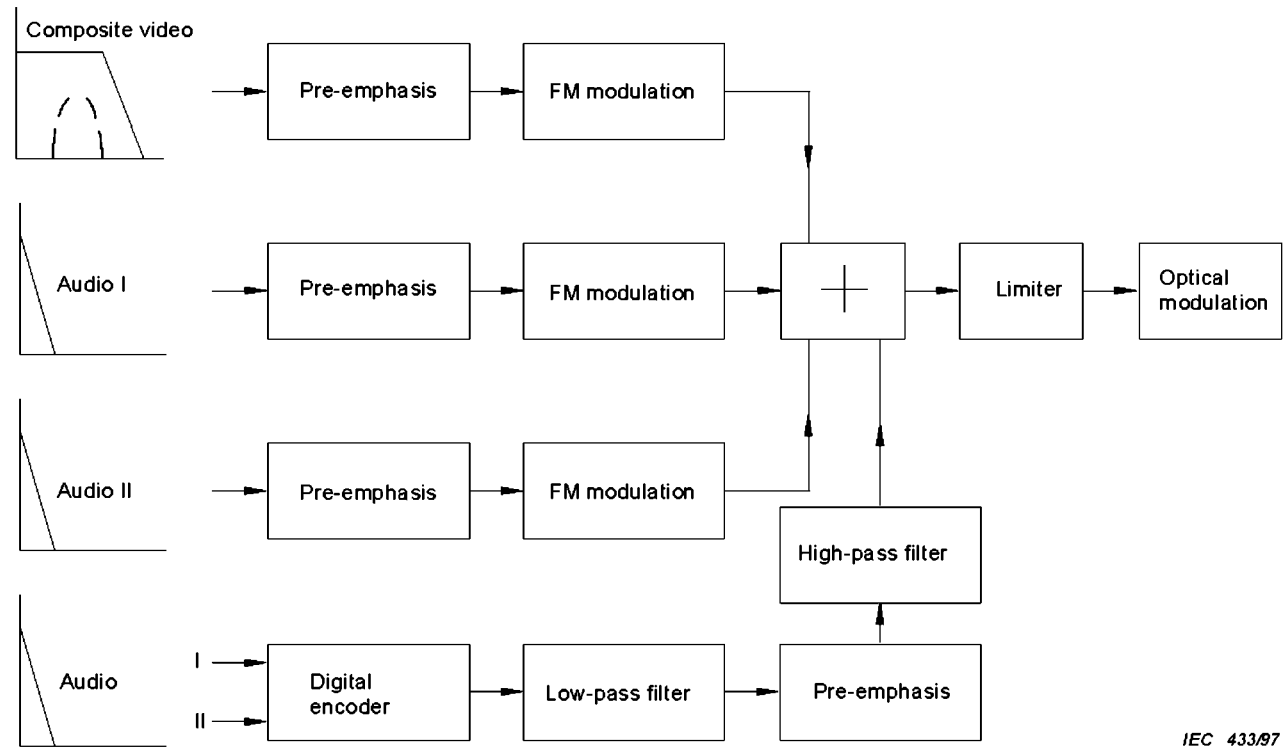
$f$  is the electrical signal frequency (Hz)

$R$  is the radius of the track (mm)

$f_r$  is the revolution frequency of the disk (Hz)

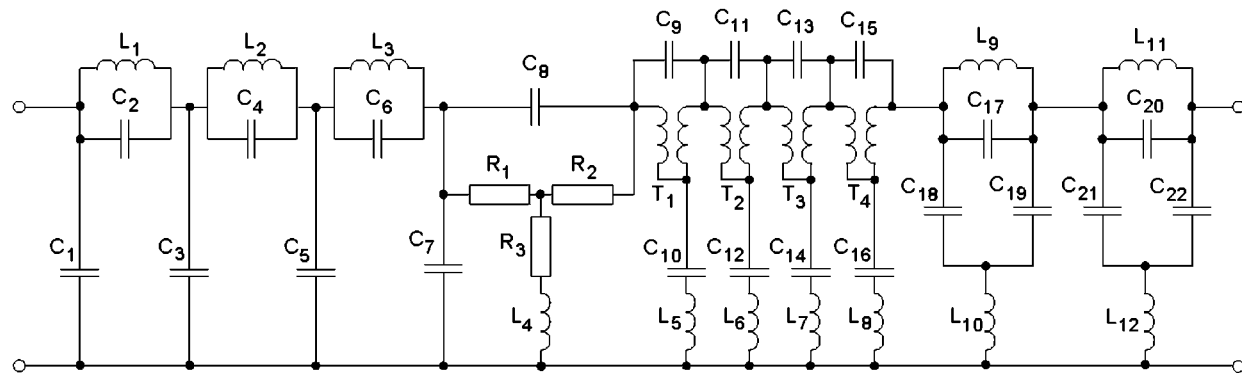
**Figure 18 – Limits of HFMI (see 12.3.1)**

Add, after figure 21, the following new figures 22 to 25:



IEC 433/97

**Figure 22 – Signal processing encoding**



IEC 434/97

C1	0,7436
C2	0,1272
C3	1,5438
C4	0,3534
C5	1,3275
C6	0,8921
C7	0,2969
C8	15,201
C9	1,2480
C10	17,4938
C11	1,2598
C12	8,7066
C13	1,2668
C14	4,2967
C15	1,2761

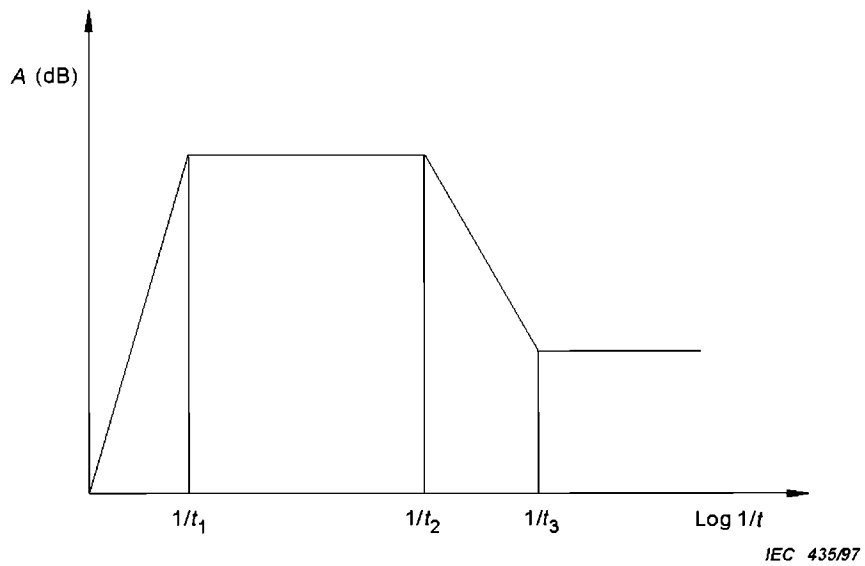
C16	2,4248
C17	0,9335
C18	0,7558
C19	0,7558
C20	1,1887
C21	0,4792
C22	0,4792
L1	1,3817
L2	1,3645
L3	0,7020
L4	15,201
L5	1,248
L6	1,2599
L7	1,2668

L8	1,2761
L9	1,5116
L10	1,3114
L11	0,9584
L12	1,4283
T1	17,4938
T2	8,7065
T3	4,2967
T4	2,4248
R1	0,0575
R2	0,0575
R3	8,266

$$F_c = 1,75 \text{ MHz}$$

NOTE – For the low-pass filter in the player parts C1 through C7 and L1, L2 and L3 are recommended.

**Figure 23 – Recommended low-pass filter part values**



High-pass filter

$$A = \frac{j\omega t_1}{1 + j\omega t_1} \quad t_1 = (75 \pm 5) \mu\text{s}$$

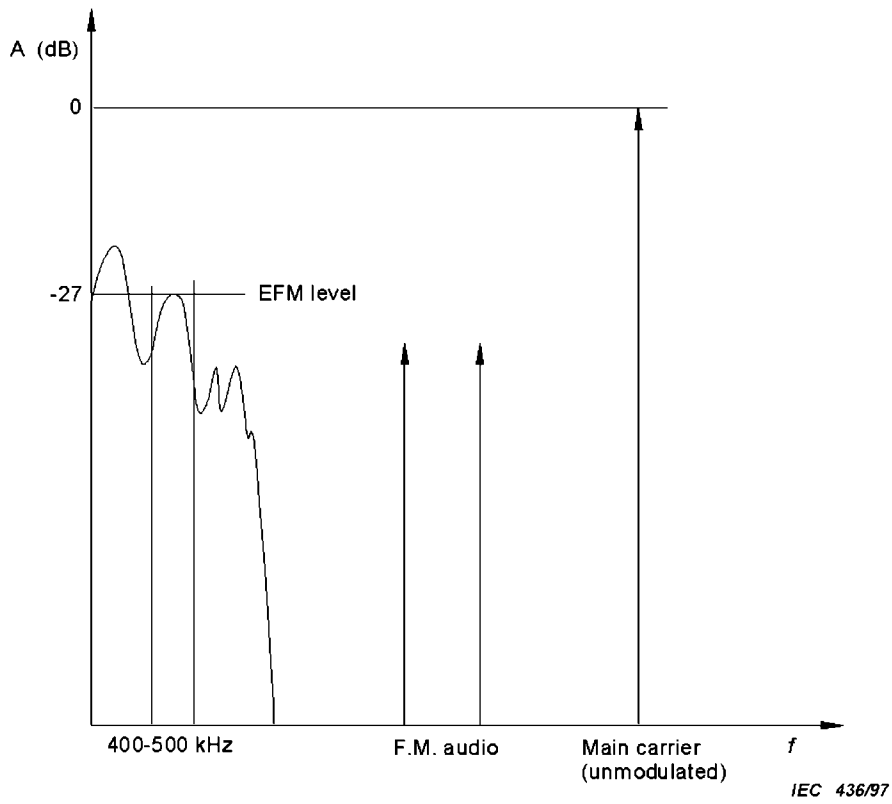
Pre-emphasis

$$A = \frac{1 + j\omega t_3}{1 + j\omega t_2} \quad t_2 = (5 \pm 0,1) \mu\text{s}; \quad t_3 = (318 \pm 6) \text{ ns}$$

**Figure 24 – High-pass filter and pre-emphasis**



Spectrum analyzer: 10 dB/div  
RBW 30 kHz  
VBW 30 kHz



**Figure 25 – Level of EFM signal**

## **Appendix A**

*Replace the existing text by the following new text:*

CAV:	Constant Angular Velocity
CCIR:	International Radio Consultative Committee
CLV:	Constant Linear Velocity
EIA:	Electronic Industries Association
FCC:	Federal Communications Commission
NA:	Numerical Aperture
PBS:	Public Broadcasting Service
VIRS:	Vertical Interval Reference Signal
ITS:	International Test Signals

Replace the existing figure B.3 by the following new figure B.3:

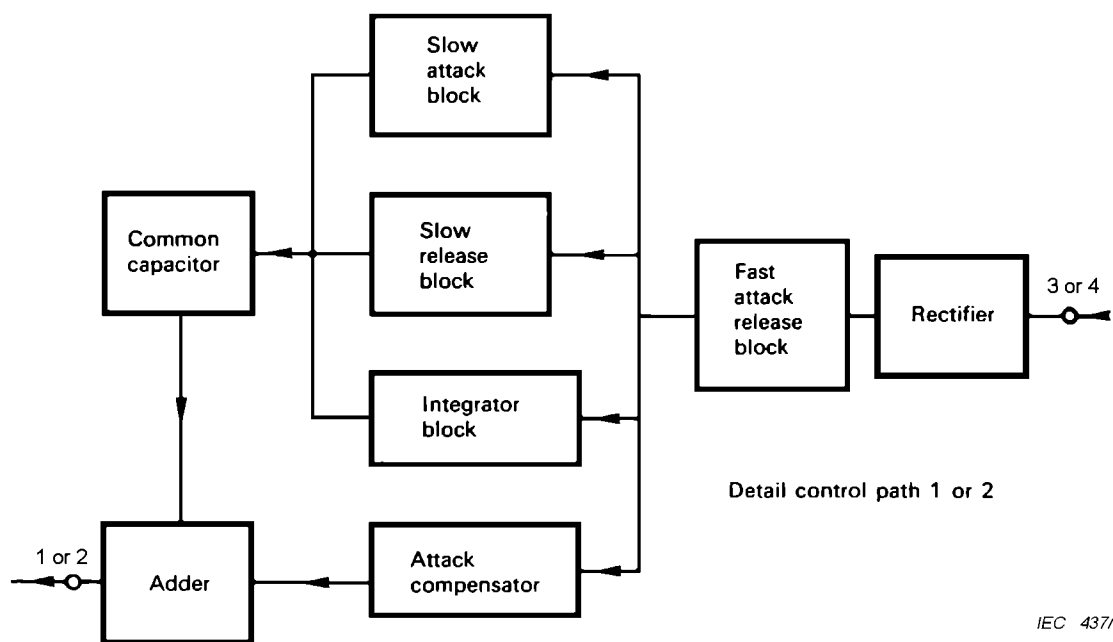
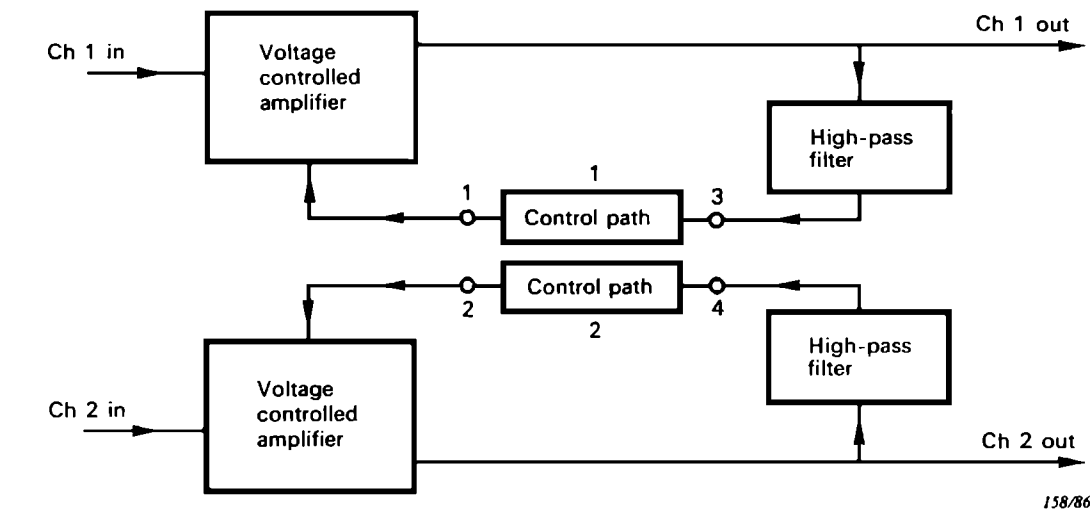


Figure B.3 – Block diagram encoder (bilingual)

## Appendix C

Replace the existing clause C.1 by the following new clause:

### C.1 Definition of the data in programme status code

$8 \frac{DC}{BA} X_3, X_4, X_5$

- DC = CX noise reduction on
- BA = CX noise reduction off
- X31 indicates disk size:  
0 = 12 inch; 1 = 8 inch
- X32 indicates disk side:  
0 = first side; 1 = second side
- X33 indicates if there are teletext signals present anywhere on the disk or not:  
0 = teletext signal absent; 1 = teletext signal present
- X34 indicates if it is allowed to copy the programme:  
0 = copy prohibited; 1 = copy permitted
- X41, X42, X43 together with X44 indicate the status of the analogue audio channels and the video signal according to the following table:

Mode	X41, X42, X43, X44	Video signal	Channel 1	Channel 2
0	0000	Standard	Stereo	
1	0001	Standard	Mono	
2	0010	Standard	Future use	
3	0011	Standard	Bilingual	
4	0100	Future use	Future use	
5	0101	Future use	Future use	
6	0110	Future use	Future use	
7	0111	Future use	Future use	
8	1000	Standard	Mono	Dump
9	1001	Future use	Future use	
10	1010	Future use	Future use	
11	1011	Future use	Future use	
12	1100	Future use	Future use	
13	1101	Future use	Future use	
14	1110	Future use	Future use	
15	1111	Future use	Future use	

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